

## COMPUTER KEYBOARD

## CROSS REFERENCE TO RELATED APPLICATIONS

This application is a continuation-in-part of pending application Ser. No. 07/328,234, filed Mar. 24, 1989, now U.S. Pat. No. 5,119,078, which is a continuation-in-part of application Ser. No. 07/33,039, filed Mar. 31, 1987 (now abandoned), which is a continuation-in-part of Ser. No. 06/921,616, filed Oct. 21, 1986 (now abandoned), the disclosures of which applications are incorporated herein by reference.

## TECHNICAL FIELD

This invention relates to the art of electronic apparatus, and particularly relates to a V-shaped keyboard for a computer having first and second sides joined at a center peak and sloping downward and away from each other.

## BACKGROUND OF THE INVENTION

Office equipment utilizing a video display and keyboard input is known. The widespread use of these devices has proven that, in many cases, severe physical strain results from their daily use. Many attempts have been made to reduce the strain caused by these devices by positioning the keyboard, display screen, and other associated components appropriately. None of these solutions has been completely successful.

U.S. Utility Patents U.S. Pat. No. 4,313,122 (Foster), U.S. Pat. No. 4,496,943 (Greenblatt), and U.S. Pat. No. 4,504,055 (Wells) show work stations wherein an input terminal is vertically below and horizontally in front of a video screen.

U.S. Pat. No. Design 194,211 (Sanderson), U.S. Pat. No. Design 250,335 (Esslinger), U.S. Pat. No. Design 268,677 (Ohie) and U.S. Pat. No. Design 270,347 (Yomo) show various arrangements for consoles having video displays and keyboards.

U.S. Pat. No. 4,562,482 shows an executive work station wherein an attempt has been made to accommodate the requirements of a person wearing bifocal spectacles. U.S. Pat. No. 3,990,565 (Felton) shows a typewriter having an attachment for providing a keyboard in two sections.

## SUMMARY OF THE INVENTION

It is known that three ocular-neurological physiological functions are linked to form a "Near-Triad" when a subject is engaged in a task requiring the use of near vision, such as reading. These three functions are accommodation, convergence, and miosis. Accommodation is the focusing of the eye to form a clear image of the close subject, convergence is the angular relationship between the two eyes to observe that near subject, and miosis is a contraction of the pupils of the eyes.

Applicant has concluded that there are, in fact, two additional ocular-neurological physiological functions associated with a task at a close distance. These additional functions are the preferred depression of gaze and undesirable excyclotorsion which accompanies viewing targets which are both close to the observer and are placed relatively high in the visual field. The depression of gaze refers to the location of the work with respect to a horizontal line at eye level, and excyclotorsion refers to an outward rotation of the superior meridian of the eyes about their anterior-posterior geometric axes.

While an individual can override the depression of gaze component and thereby focus clearly on a near object having a high placement in the visual field, this commonly produces symptoms such as eyestrain, headache, nausea, motion-sickness. Neck and shoulder discomfort also occur because the individual will posture into a capitas-extension position (head tipped backward-chin elevated) as a means of allowing an artificial (or false) depression of gaze and minimizing excyclotorsion. The five factors may be referred to as a "near quintad."

One factor producing increased tension is that the typical word processing or personal computer keyboard has approximately 85 keys (or even more), compared with no more than 60 keys for a typewriter. An operator is required to look at these keys frequently because the locations of many of the keys are not automatically known, as are the locations of the alphabet keys. Also, virtually all software programs require the use of several unfamiliar keys simultaneously, such as "Alt-F5, Shift-F10 or Control-F2." Thus, the modern keyboard must be considered to be a tool having 85 or more choices for which the operator must repeatedly view the keyboard and then the screen to select one or more keys and to verify completion of an operation.

Studies indicate that excyclotorsion, which accompanies convergence, is reduced if the direction of gaze is depressed. The greatest subjective comfort is produced when the visual target is placed in a depressed position of gaze.

The prior art has failed to adequately address these physiological factors, and no apparatus has been provided which simultaneously addresses the five functions (the "near quintad") found by Applicant to be significant.

For example, U.S. Pat. No. 4,562,482 (Brown) is concerned only with the angular extent of a bifocal segment and the optimum distance for focusing when viewing through that segment. U.S. Pat. No. 3,990,565 (Felton) teaches an apparatus which allows one to view a document being worked on at a close distance, but the work product is at a substantial distance and is angularly displaced by a large degree.

In accordance with the invention, a cabinet for a work station is provided which efficiently accounts for the five interrelated physiological factors discussed above. A video display screen is mounted in a cabinet at an angle below a horizontal line at eye level for the operator to provide depression of gaze. A document to be read by the operator is placed below the screen such that the angular excursion between the document and the video screen is within physiological comfort limits. In one embodiment, the document to be viewed is electronically projected onto the display screen so that it may be placed at almost any location.

A preferred keyboard is designed such that a user may acquire total tactile familiarity with the keyboard, thus enabling the user to copy written material and look at the screen while typing without looking at the keyboard. Operator fatigue and frequency of error are reduced even further where the keyboard is superimposed on the screen and eye movement from screen to keyboard is minimized.

The preferred keyboard of the invention is divided at its midpoint by a central peak and the outer portions slant away from the central peak and upwardly away from the user to form a shallow V-shape. The V-shaped keyboard configuration lessens ulnar abducted devia-